

**REMARKS****Summary of the Office Action**

Claims 1-2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Miyamoto (JP 55-165687) (hereinafter "Miyamoto").

Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto in view of Miyaguchi (JP 05-075090) (hereinafter "Miyaguchi").

**Summary of the Response to the Office Action**

Applicant has amended claims 1 and 2 to differently describe embodiments of the disclosure of the instant application and/or to improve the form of the claims. Accordingly, claims 1-4 remain currently pending for consideration.

**Rejections under 35 U.S.C. §§ 102(b) and 103(a)**

Claims 1-2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Miyamoto. Claims 3-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Miyamoto in Miyaguchi. Applicants have amended claims 1-2 to differently describe embodiments of the disclosure of the instant application and/or to improve the form of the claims. Accordingly, to the extent that these rejections might be deemed to still apply to the claims as newly-amended and newly-added, they are respectfully traversed for at least the following reasons.

Applicants have amended independent claim 1 of the instant application to describe an advantageous combination of features of an energy ray detecting element including a voltage dividing circuit feature that clearly differs from the disclosure in Miyamoto at least with regard to the structure of a charge transfer mechanism, for example. More particularly, independent

claim 1 of the instant application has been newly-amended to describe a voltage circuit that has terminals directly and electrically connected to electrodes provided on the energy ray sensitive region. On the other hand, Applicants respectfully submit that the voltage dividing circuit disclosed in Miyamoto does not have terminals directly connected to the transfer electrodes G1-G6. Applicants respectfully submit that the transfer electrodes G1-G6 are directly connected to the connection points 81-86 between MOSFETs, and therefore terminals of the voltage dividing circuit of Miyamoto are connected to only drain terminals of MOSFETs Q21-Q26.

Applicants respectfully submit that, as can be easily understood from this structural difference, the claimed voltage circuit can coincidentally provide predetermined potentials to the electrodes on the energy ray sensitive region through the directly-connected terminals, in order to form a single potential well with respect to the energy ray sensitive region. See paragraph [0021], for example, of the specification of the instant application. Applicants respectfully submit that the bottom parts of the formed single potential well, which are positioned below said electrodes, become gradually deeper in a charge transferring direction. See, for example, Fig. 3 of the instant application. In other words, Applicants respectfully submit that while the claimed voltage dividing circuit is supplied with a bias voltage, the claimed energy ray detecting element cascades the charges generated in response to the incidence of energy rays toward the output section.

On the other hand, Applicants respectfully submit that Miyamoto mainly describes a time delay integration type CCD. Applicants respectfully submit that Miyamoto carries out the charge transfer by moving a position where a potential well should be formed along a charge transfer direction, in accordance with the driving timing of the shift resistor 10. Applicants respectfully submit that since the device disclosed in Miyamoto carries out charge transfer by

bucket brigade for charge between potential wells, the potential barriers 50-56 are formed to prevent a back-flow of charges. Applicants respectfully submit that for the bucket brigade of charge and the potential barrier formation, the potential wells 41-46 in the areas (b) and (c) of Fig. 2 are not coincidentally formed, namely the transfer electrodes G1-G6 are not coincidentally provided with predetermined potentials. That is, Applicants respectfully submit that it is technically clear that the voltage dividing circuit disclosed in Miyamoto does not have terminals directed to the transfer electrodes G1-G6. The voltage dividing circuit in Miyamoto includes resistors 91-97, but these resistors are provided as part of the driving circuit 60 to make potential wells to be formed below the electrodes G1-G6 become deeper along a charge transfer direction. Applicants respectfully submit that the claimed combination of newly-amended independent claim 1 of the instant application includes a feature in that the charges are cascaded toward the output section, and therefore such potential barriers are not formed and further not theoretically necessary.

As a second point, Applicants respectfully submit that the energy ray detecting element, as claimed in dependent claims 3 and 4, suppresses or allows the charge movement from the energy ray sensitive region to the floating diffusion, in accordance with the logic level of clock signal. In other words, the energy ray sensitive region and the floating diffusion are coupled or separated between their capacities. That is, the capacity of the energy ray sensitive region does not have an effect at the time of converting the accumulated charges in the floating diffusion to a voltage or current. In other words, the capacity to be connected to the gate of MOSFET (31 in Fig. 2, for example), which constitutes a charge voltage conversion circuit or current amplifying circuit, can be set at only capacity of the floating diffusion that is smaller than that of the energy ray sensitive region, and therefore a noise, which causes at the time of converting the

accumulated charges in the floating diffusion to a voltage or current, can be further reduced.

See, for example, paragraphs [0004] and [0034] of the specification of the instant application.

In contrast, Applicants respectfully submit that Miyamoto describes only structure outputting the accumulated charges in the floating diffusion without carrying out some conversions through the diode 2. As a result, Applicants respectfully submit that Miyamoto does not teach or suggest matters relating to the claimed structure or effects specifically described in newly-amended independent claim 1 of the instant application. Applicants respectfully submit that the device disclosed in Miyamoto is directed to a CCD, and a horizontal shift register (serial register S) is disposed between the charge output section and the light-receiving region. That is, the large light-receiving region and the charge output section is not coupled between their capacities. As previously described, Applicants respectfully submit that even though the floating diffusion amplifier as described in Miyamoto is provided in order to output voltage signals or current signals corresponding to the accumulated charges outputted from CCD, the capacities of the light-receiving region and the floating diffusion are always free from each other. In this case, the problem to be solved by the claimed invention (noise increase due to capacity increase of the output section, for example) does not occur.

Applicants respectfully submit that at least these particular characterizing features of the combination of independent claim 1 of the instant application are not disclosed in the applied Miyamoto reference. Thus, Miyamoto does not disclose all of the features of the combination of features described in independent claim 1 of the instant application.

The remaining independent claim 2 has also been newly-amended to include similar features as discussed above with regard to newly-amended independent claim 1. Accordingly,

similar arguments as discussed above with regard to newly-amended independent claim 1 of the instant application also apply to newly-amended independent claim 2 of the instant application.

Accordingly, Applicant respectfully asserts that the rejections under 35 U.S.C. §§ 102(b) and 103(a) should be withdrawn because Miyamoto does not teach or suggest each feature of independent claims 1 and 2 of the instant application. As pointed out in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim." Thus, "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987)." Similarly, MPEP § 2143.03 instructs that "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)."

Claims 3-4 are deemed to be allowable at least because of their dependence from independent claim 1 or 2, and the reasons set forth previously. In addition, Applicants respectfully submit that the additionally-applied Miyaguchi reference, with regard to dependent claims 3 and 4, does not cure the above-noted deficiencies of Miyamoto.

### CONCLUSION

In view of the foregoing, Applicants submit that the pending claims are in condition for allowance, and respectfully request reconsideration and timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative to expedite prosecution. A favorable action is awaited.

**EXCEPT** for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. § 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0573. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Respectfully submitted,

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